COLLIDER INSTALLATION (WBS 1.0)

i. Ring Element Nomenclature System

The nomenclature system presented here identifies main magnets and other ring elements and their positions in the ring structure. The present designation takes into account practical considerations, such as machine installation and operation. Since RHIC will become part of an ever increasing string of machines, to be operated from a central control facility, the nomenclature system is compatible with the requirements of the Control Group data base design.[1]

Details of the nomenclature system have been reviewed and accepted by the RHIC Layout Task Force and the scientific and professional staff of the Collider -Accelerator Department.

The convention upon which the new nomenclature system is based consists of the use of two fields separated by a dash. The first set of symbols specifies graphical location in the ring (zip code) and the second to the right of the dash describes the tag name of the machine element, element properties, etc.

RHIC Ring Geographical Structure

The two rings are identified as *yellow* (Y) and *blue* (B). Particles in the Y-ring travel in the counterclockwise direction, and clockwise in the B-Ring. For practical reasons the sextants are also identified as *inner* (I) and *outer* (O).

Each ring is divided into 12 half-sextants, hereafter called sectors. Each sector is fully defined by

- the blue/yellow label
- the inner/outer position
- the clock position 1 to 12

taking the crossing point between the injection points as 6 o'clock on a clock face as illustrated in Fig. 0-1.

For instance, the one o'clock position starts at the center of the arc at one o'clock and ends just before the cross-over point at the two o'clock position. The two o'clock position starts with the cross-over point at two and ends just before the center of the arc at

[1] E. H. Auerbach, Booster Tech. Note No. 166 (24 May 1990)

the three o'clock position, etc. The position of an accelerator element is therefore given by the set of geographical identifiers listed in Table 0-1.

A dash (-) separates the geographical identifier from the element description. Thus, a typical address would look like this: BO11-XXXX where the four X's indicate the machine element name or qualifier.

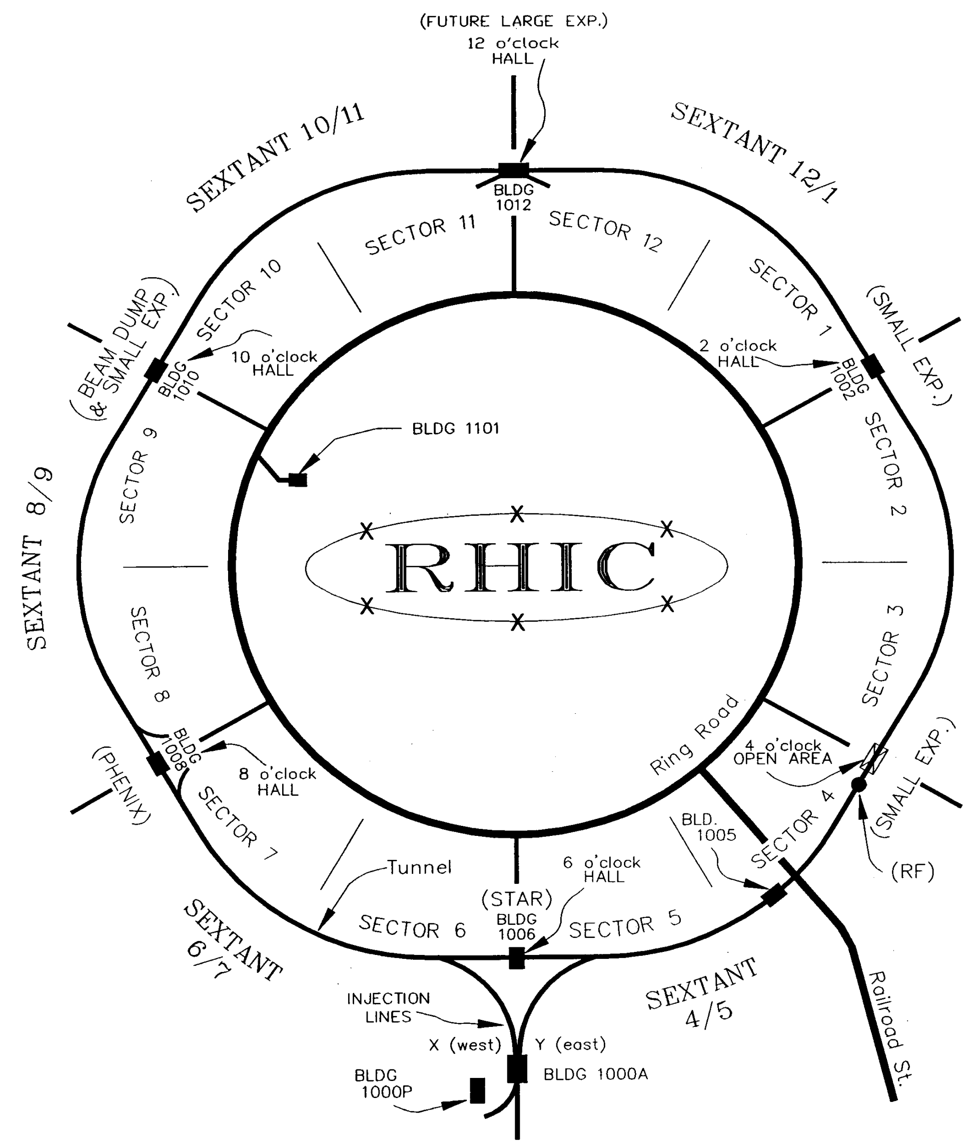

Fig. 0-1. Map, region names and main buildings.

Table 0-1. Geographical Identifiers

Inner Sectors either/	or*	Outer Sectors either/	or*
BI1	I1	YO1	O1
YI2	I2	BO2	O2
YI3	I3	BO3	O3
BI4	I4	YO4	O4
BI5	I5	YO5	O5 (injection)
YI6	I6	BO6	O6 (injection)
YI7	I7	BO7	O7
BI8	I8	YO8	O8
BI9	I9	YO9	O9 (dump)
YI10	I10	BO10	O10 (dump)
YI11	I11	BO11	O11
BI12	I12	YO12	O12

*On drawings and schematics and where there is no loss of clarity, the shortened geographical identifiers may be used.

Numbering of Dipole and Quadrupole Magnets and Quadrupole Assemblies

The quadrupoles of a sector are numbered consecutively, starting from the crossing point and going either in clockwise or counterclockwise direction, as Q1 to Q20 for even sectors and Q1 to Q21 for odd sectors. This is illustrated for sector 1 in Fig. 0-2.

The dipoles of a sector are numbered according to the quadrupole position, e.g. the dipole number follows the quadrupole number. The dipole common to both beams near the crossing point is called DX. Figure 0-2 explains the scheme.

Correctors "C", sextupoles "S", and trim quadrupoles "T" form together with a quadrupole "Q" permanent subassemblies, the so-called cold masses, in a common cryostat. The cryostat assemblies are named corresponding to their cold masses as CQS, CQT, CQB, CQC, CQ, or Q. They carry the same ring location number as their associated quadrupole. In the CQB assembly, the sextupole is substituted by a blank yoke without coil. CQ contains no sextupole and is physically shortened to provide space for the injection devices. CQC is a cold mass in the interaction region triplet containing the quadrupole Q3 and corrector packages at each end. Q is the triplet quadrupole Q1 without attached corrector.

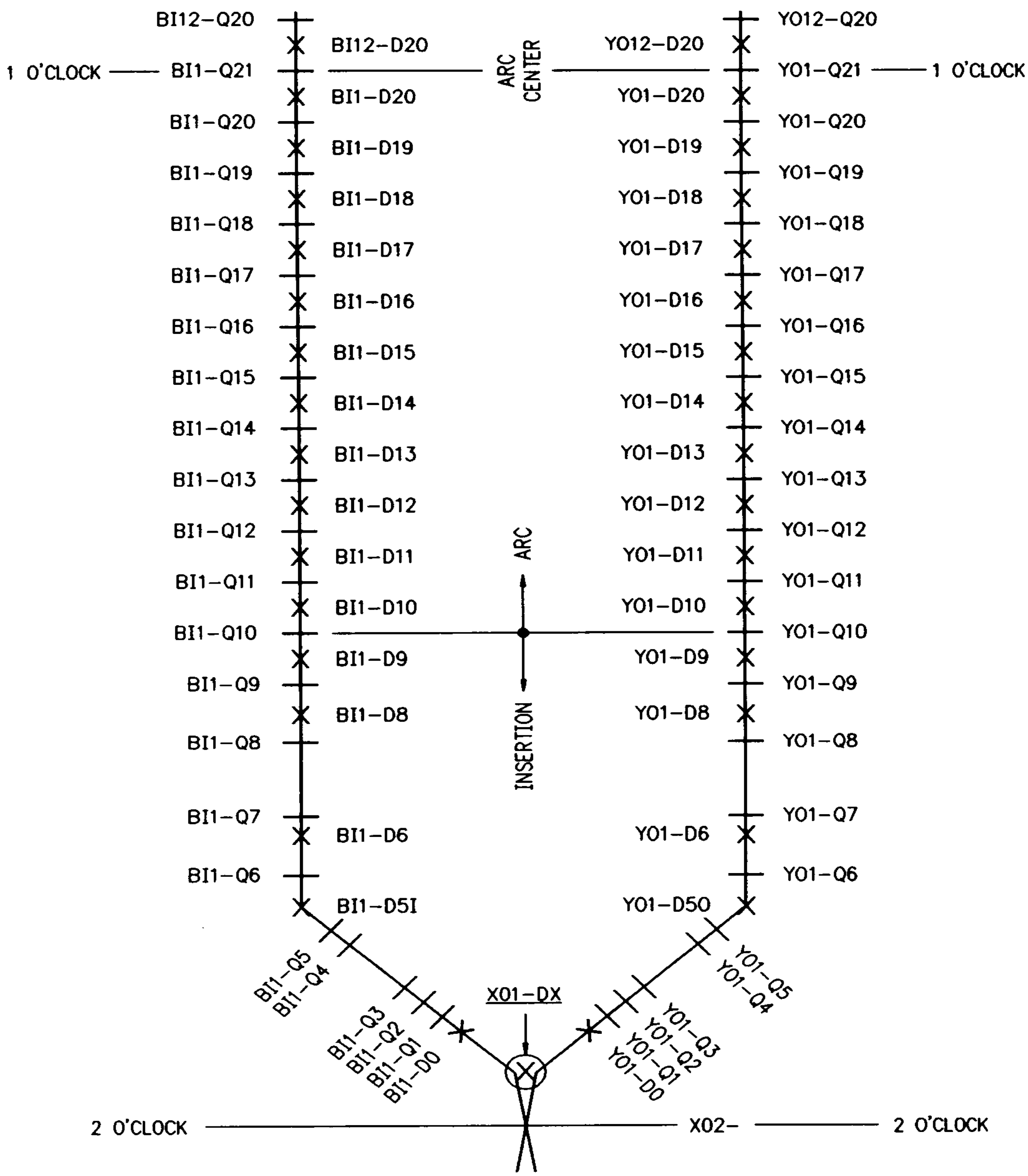

Fig. 0-2. Sector (half sextant) magnets.

A Structured System of Element Description

Machine elements are called by their generic names with qualifiers added. Abbreviations to be chosen should be suggestive to initiated persons, as short as possible, and be unique. For instance, dipoles may be of the following kinds:

Dipole	D
Dipole Vertical	DV
Dipole Horizontal	DH

The letter D in the first position is therefore reserved to identify a dipole class of magnets. The second letter always identifies the kind of dipole or its action on the beam. [Note:An exception to this is the DU or dummy magnet. Dummy magnets are non-magnetic elements, but fill a lattice space traditional held by a dipole class of magnet.] The third qualifier, if needed, provides further qualifications, such as machine element association or more operational information. . Examples are:

Dipole Kicker Injection	DKI
Dipole Kicker Ejection	DKE
Dipole Septum Injection	DSI
Dipole Septum Ejection	DSE
Dummy Magnet	DU
and so on...	

Another frequently occurring class of magnets are quadrupoles. Applying the above scheme one has:

Quadrupole	Q
Quadrupole Focussing	QF
Quadrupole Defocussing	QD
Quadrupole Skewed	QS
and so on...	

The magnets installed for spin physics are the helical dipoles. Again, applying the scheme above:

Helical Snake Dipole	SNK
Helical Rotator Dipole	ROT

The above list is not inclusive, but showed as a guide for the creation of additional symbols and logic abbreviations for all machine-associated data base variables. Since the control system data base is the one area where all tag names are gather together, system managers should be sure that their element descriptions are unique, suggestive of use or purpose, and should check with the C-A Controls Division to be sure that no conflicts or other problems arise when added to the control systems data base.

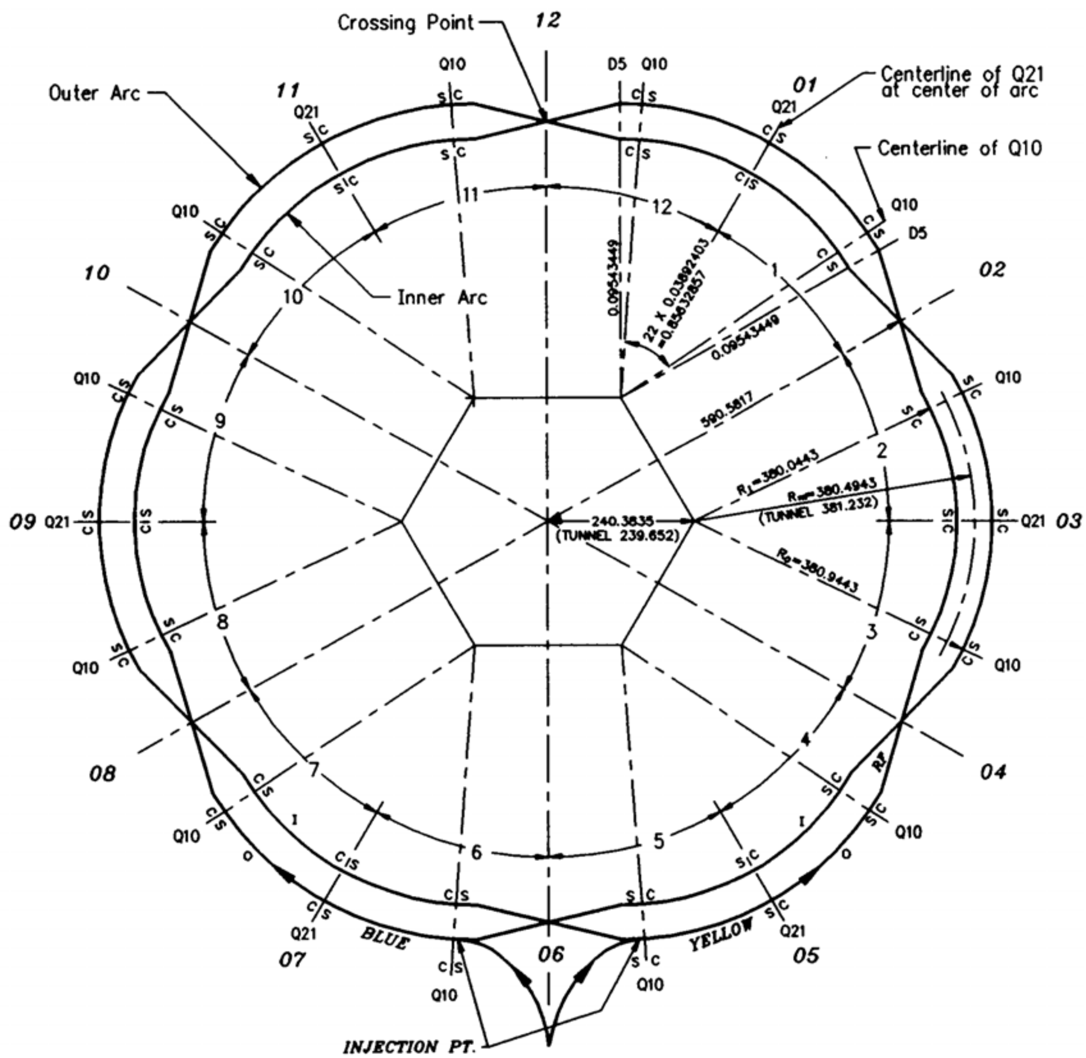

Fig. 0-3. Reference geometry and collider layout. (Ring radii defined by quadrupole center, dimensions in m).